

WHAT IS CLAIMED IS:

1. A charging system for a vehicle, comprising:

an motor generator which operates as a generator to generate an alternating current when said motor generator is driven by an internal combustion engine, and operates as a motor when the alternating current is supplied thereto;

5 a switching circuit for converting the alternating current generated by said motor generator into a direct current;

a first accumulator accumulating therein the direct current converted by said switching circuit;

10 a second accumulator accumulating therein the direct current converted by said switching circuit and having a smaller accumulation voltage than that of said first accumulator;

15 a first opening/closing unit interposed between said first accumulator and said switching circuit;

20 a second opening/closing unit interposed between said second accumulator and said switching circuit; and,

a control unit for controlling the opening and closing of said first and second opening/closing units.

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25 2. A charging system for a vehicle as set forth in Claim 1, wherein said first opening/closing unit comprises:

a first transistor having a collector connected to a positive terminal of said first accumulator and an emitter connected to a positive-side input/output terminal of said switching circuit; and

a diode disposed in parallel to said first transistor for allowing a current to flow therethrough in a direction from said positive-side input/output terminal of said switching circuit toward said positive terminal of said first accumulator,

5 and,

wherein said second opening/closing unit comprises:

a second transistor having a collector connected to said positive-side input/output terminal of said switching circuit; and

10 a reverse current preventive diode connected between the emitter of said second transistor and said positive terminal of said second accumulator for preventing a current from flowing in a direction from the positive terminal of said second accumulator toward said emitter of said second transistor.

15 3. A charging system for a vehicle as set forth in Claim 1, wherein said control unit comprises:

a drive mode for driving said motor generator using said first accumulator;

20 a first accumulating mode for accumulating electric power generated by said motor generator in said first accumulator; and

a second accumulating mode for accumulating electric power generated by said motor generator in said second accumulator,

25 and

wherein, in said drive mode, said first opening/closing

unit is held in a closed state and said second opening/closing unit is held in an opened state,

5 further wherein, in said first accumulating mode, said first and second opening/closing units are both held in an opened state, and,

6 further wherein, in said second accumulating mode, said first opening/closing unit is held in an opened state and said second opening/closing unit is held in a closed state.

10 4. A charging system for a vehicle as set forth in Claim 1, further comprising:

11 a voltage detect unit for detecting the accumulated voltages of said first and second accumulators,

12 wherein said control unit controls the electric 15 energization rate of said switching circuit according to the deviation of the detected voltage detected by said voltage detect unit from a previously set reference voltage.

20 5. A charging system for a vehicle as set forth in Claim 1, further comprising:

21 a smoothing condenser connected between the positive-side input/output terminal of said switching circuit and a grounding terminal,

22 wherein said control unit includes a pre-charge mode for 25 opening and closing said first opening/closing unit with a previously set electric energization rate so as to charge said

smoothing condenser.

6. A charging system for a vehicle as set forth in Claim 1, further comprising:

5 a smoothing condenser connected between the positive-side input/output terminal of said switching circuit and a grounding terminal,

wherein said control unit includes a discharge mode for opening and closing said second opening/closing unit with a 10 previously set electric energization rate so as to discharge said smoothing condenser.

7. A charging system for a vehicle as set forth in Claim 5, further comprising:

15 a current detect unit for detecting an input current to said switching circuit,

wherein said control unit controls the electric energization rate of said first opening/closing unit according 20 to the deviation of a detected current value detected by said current detect unit from a previously set reference current value.

8. A charging system for a vehicle as set forth in Claim 6, further comprising:

25 a current detect unit for detecting an input current to said switching circuit,

wherein said control unit controls the electric energization rate of said second opening/closing unit according to the deviation of a detected current value detected by said current detect unit from a previously set reference current

5 value.

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